

Appl. No. 10/086,497
Amendment dated: August 28, 2003
Reply to Restriction Requirement of July 23, 2003

Listing of Claims

1. (Previously Presented) A layer-by-layer etching apparatus using a neutral beam, the layer-by-layer etching apparatus comprising:
 - a reaction chamber having a stage therein on which a substrate to be etched is mounted;
 - a neutral beam generator for generating a neutral beam from a source gas to supply the neutral beam into the reaction chamber;
 - a shutter disposed between the neutral beam generator and the reaction chamber, for controlling the supply of the neutral beam into the reaction chamber;
 - an etching gas supply for supplying an etching gas into the reaction chamber;
 - a purge gas supply for supplying a purge gas into the reaction chamber; and
 - a controller for controlling the supply of the source gas, the etching gas, and the purge gas and opening and closing of the shutter.
2. (Previously Presented) The layer-by-layer etching apparatus of claim 1, wherein the neutral beam generator comprises:
 - an ion source for extracting an ion beam having a predetermined polarity from the source gas and accelerating the ion beam; and
 - a reflector positioned in a path of the ion beam accelerated from the ion source, for reflecting and neutralizing the ion beam.
3. (Previously Presented) The layer-by-layer etching apparatus of claim 2, wherein the reflector has a plate shape.
4. (Previously Presented) The layer-by-layer etching apparatus of claim 2, wherein the reflector comprises a plurality of co-centric cylindrical reflecting members and different polar voltages are applied to adjacent reflecting members.
5. (Original) The layer-by-layer etching apparatus of claim 2, wherein the reflector is one of a semiconductor substrate, a silicon dioxide, and a metal substrate.

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6. (Original) The layer-by-layer etching apparatus of claim 2, wherein the ion source is one of a high-density helicon plasma ion gun and an ICP-type ion gun.

7. (Previously Presented) The layer-by-layer etching apparatus of claim 1, wherein the substrate to be etched contains silicon.

8-15. (Cancelled)

16. (Previously Presented) The layer-by-layer etching apparatus of claim 3, wherein the reflector is tiltable to control an angle of incidence of the ion beam which is incident thereto.

17. (Previously Presented) The layer-by-layer etching apparatus of claim 1, wherein the neutral beam is an argon neutral beam.

18. (Previously Presented) The layer-by-layer etching apparatus of claim 1, wherein the etching gas comprises a chlorine gas.

19-21. (Cancelled)